

ECOSYSTEM STATUS INDICATORS***Physical Environment*****GULF OF ALASKA****Pollock Survival Indices –FOCI**

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Seasonal rainfall at Kodiak

FOCI uses measured Kodiak rainfall as a proxy for freshwater discharge that promotes formation of baroclinic instabilities (eddies) in the Alaska Coastal Current (ACC) flowing through Shelikof Strait (Megrey et al. 1996). The amount of measured monthly rainfall drives a simple model that produces an index of survival for age-0 walleye pollock. These young fish may benefit from spending their earliest developmental stages within eddies (Schumacher and Stabenro 1994). The model assumes that greater-than-average late winter (January, February, March) precipitation produces a greater snow pack. When the snow melts during spring and summer, it promotes discharge of fresh water through rivers and streams into the ACC. Similarly, greater than average spring and early summer rainfall, with nearly immediate run-off, also favors increased baroclinity after spawning. Conversely, decreased rainfall is likely detrimental to pollock survival because they do not find the circulation features that promote their survival.

The time series of FOCI's pollock survival index based on measured precipitation is shown in Figure 9. Although there is large interannual variability, a trend toward increased survival potential is apparent from 1962 (the start of the time series) until the mid 1980s. Since then, the survival potential has been more level. Survival potential increased in 2003 and 2004 because almost all winter and spring months experienced average or greater rainfall than their respective 30-year averages. In 2005, precipitation remained somewhat above average but less so than in the previous two years. Thus, the 2005 pollock survival potential based on precipitation, alone, is a bit less than in 2004, although still in the category of "average to strong" recruitment. Interestingly, the precipitation-based survival index does not appear to track any of the long-term climate indices (e.g., Arctic Oscillation (AO) index, Pacific Decadal Oscillation (PDO)) with any consistency, possibly because of the way winter and spring precipitation are used in the model. In the 3-yr running mean of the precipitation survival index, there is a change from decreasing to increasing survival potential in 1989. In that year, there was an abrupt shift in the AO.

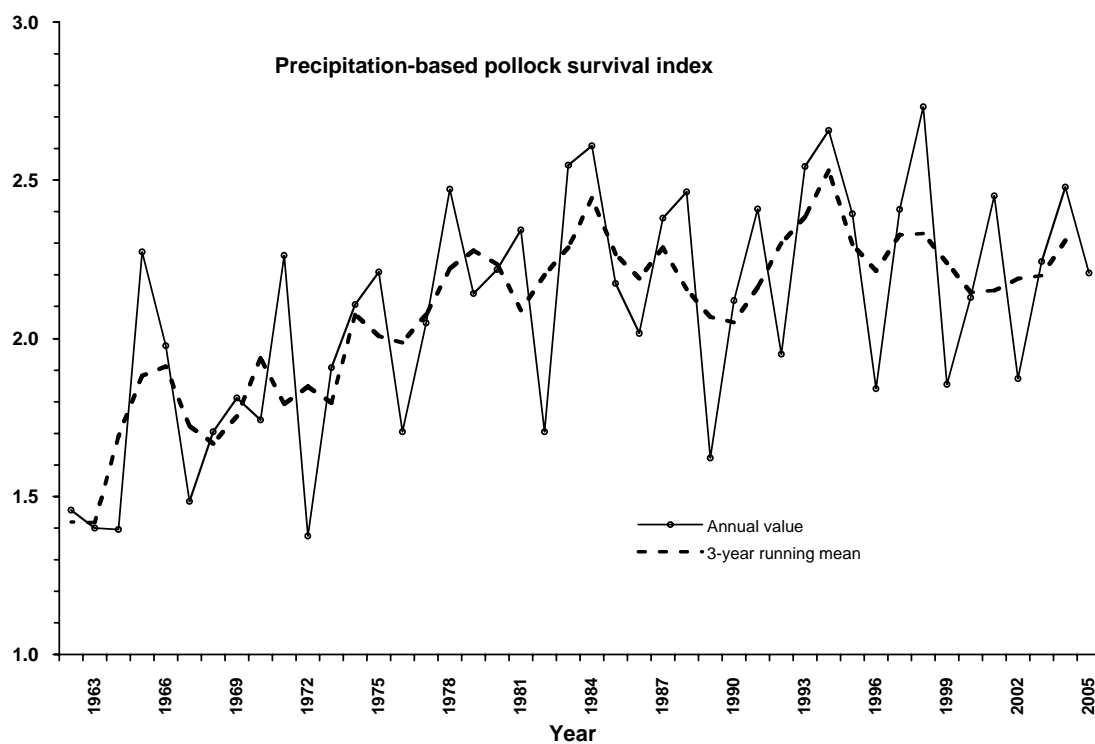


Figure 9. Index of pollock survival potential based on measured precipitation at Kodiak from 1962 through 2005. The solid line shows annual values of the index; the dashed line is the 3-year running mean.